

CLAIMS

What is claimed is:

1. A composition of L-ascorbic acid derivatives, comprising:

5 a. L-ascorbic acid and

b. lysine or lysine moieties, wherein L-ascorbic acid is covalently bound to the lysine or lysine moieties.

2. The composition of claim 1 wherein the L-ascorbic acid is covalently bound to the lysine or lysine moieties in the C-6 position of the L-ascorbic acid.

10 3. The composition of claim 1 wherein the L-ascorbic acid is covalently bound to the lysine or lysine moieties in the C-2 position of the L-ascorbic acid.

4. The composition of claim 1 wherein the L-ascorbic acid is covalently bound to one or more lysine in C-6 position of the L-ascorbic acid.

15 5. The composition of claim 1 wherein the L-ascorbic acid is covalently bound to one or more lysine in C-2 position of the L-ascorbic acid.

6. The composition of claim 1 wherein L-ascorbic acid is covalently bound to a first lysine in C-6 position and a second lysine in C-2 position of the L-ascorbic acid.

20 7. The composition of claim 1 wherein the L-ascorbic acid is covalently bound to two or more lysine in C-6 position and one lysine in C-2 position of the L-ascorbic acid.

8. The composition of claim 1 wherein the L-ascorbic acid is covalently bound to one lysine in C-6 position and two or more lysine in C-2 position L-ascorbic acid.

25 9. The composition of claim 1 wherein L-ascorbic acid is covalently bound to two or more lysine in C-6 position and two or more lysine in C-2 position of the L-ascorbic acid.

10. A composition of L-ascorbic acid derivatives, comprising:

a. L-ascorbic acid and

30 b. proline or proline moieties wherein the proline or proline moieties are covalently bound to L-ascorbic acid.

11. The composition of claim 10 wherein the L-ascorbic acid is covalently bound to proline in C-6 position of the L-ascorbic acid.
12. The composition of claim 10 wherein the L-ascorbic acid is covalently bound to proline in C-2 position of the L-ascorbic acid.
- 5 13. The composition of claim 10 wherein the L-ascorbic acid is covalently bound to two or more proline in C-6 position of the L-ascorbic acid.
14. The composition of claim 10 wherein the L-ascorbic acid is covalently bound to two or more proline in C-2 position of the L-ascorbic acid.
- 10 15. The composition of claim 10 wherein the L-ascorbic acid is covalently bound to a first proline in C-6 position of the L-ascorbic acid and a second proline in C-2 position of the L-ascorbic acid.
16. The composition of claim 10 wherein L-ascorbic acid is covalently bound to a proline in C-2 position of the L-ascorbic acid and a polyproline in C-6 position of the L-ascorbic acid.
- 15 17. The composition of claim 10 wherein the L-ascorbic acid is covalently bound to a polyproline in C-2 position of the L-ascorbic acid and a proline molecule in C-6 position of the L-ascorbic acid.
18. The composition of claim 10 wherein the L-ascorbic acid is covalently bound to a first polyproline at C-2 position of the L-ascorbic acid and a second
- 20 polyproline at C-6 position of the L-ascorbic acid.
19. A method of preparing L-ascorbic acid derivatives, comprising the steps of:
- 1) treating 6-deoxybromoascorbate with lysine or lysine moieties wherein L-ascorbic acid is covalently bound to the lysine or lysine moieties; and
- 2) isolating the L-ascorbic acid derivatives; wherein the 6-
- 25 deoxybromoascorbate is covalently bound to one lysine.
20. The method of claim 19 wherein the 6-deoxybromoascorbate is reacted to the ϵ -NH₂ group of lysine.
21. The method of claim 19 wherein wherein the 6-deoxybromoascorbate is covalently bound to a polylysine.
- 30 22. The method of claim 19 wherein the 6-deoxybromoascorbate is reacted to the ϵ -NH₂ group of polylysine.

23. A method of preparing L-ascorbic acid derivatives, comprising the steps of:

1) treating 6-deoxybromoascorbate with proline or proline moieties wherein L-ascorbic acid is covalently bound to the proline or proline moieties; and

5 2) isolating said L-ascorbic acid derivatives.

24. The method of claim 23 wherein the 6-deoxybromoascorbate is covalently bound to polyproline.

25. The method of claim 23 wherein the 6-deoxybromoascorbate is covalently bound to a first proline at C-2 position of the L-ascorbic acid and a polylysine
10 at C-6 position of the L-ascorbic acid.

26. A method of preparing L-ascorbic acid derivatives, comprising the steps of:

1) treating 6-deoxybromoascorbate with lysine or lysine moieties and proline or proline moieties wherein L-ascorbic acid is covalently bound to the lysine or lysine moieties and proline or proline moieties; and

15 2) isolating said L-ascorbic acid derivatives.

27. The method of claim 26 wherein the 6-deoxybromoascorbate is covalently bound to a proline at C-2 position of the L-ascorbic acid and one lysine at C-6 position of the L-ascorbic acid.

28. The method of claim 26 wherein the 6-deoxybromoascorbate is covalently
20 bound to a proline at C-6 position of the L-ascorbic acid and a polylysine at C-2 position of the L-ascorbic acid.

29. The method of claim 26 wherein the 6-deoxybromoascorbate is covalently bound to a polyproline at the C-6 position of the L-ascorbic acid and one lysine at the C-2 position of the L-ascorbic acid.

25 30. The method of claim 26 wherein the 6-deoxybromoascorbate is covalently bound to the ϵ -NH₂ group of lysine.

31. The method of claim 26 wherein the 6-deoxybromoascorbate is covalently bound to a proline at C-6 position of the L-ascorbic acid and a polylysine at C-6 position of the L-ascorbic acid.

30 32. The method of claim 26 wherein the 6-deoxybromoascorbate is covalently bound to a proline and a lysine-proline at C-2 position of the L-ascorbic acid.

33. The method of claim 26 wherein the 6-deoxybromoascorbate is covalently bound to a proline and a proline-lysine at C-2 position of the L-ascorbic acid.
34. The method of claim 26 wherein the 6-deoxybromoascorbate is covalently bound to the α -NH₂ group of lysine.
- 5 35. The method of claim 26 wherein the 6-deoxybromoascorbate is covalently bound to the α -NH₂ group of polylysine.
36. The method of claim 26 wherein the 6-deoxybromoascorbate is covalently bound to lysine-proline.
37. The method of claim 26 wherein the 6-deoxybromoascorbate is covalently
10 bound to the α -NH₂ group of lysine at C-6 position of the L-ascorbic acid and one proline at C-2 position of the L-ascorbic acid.
38. The method of claim 26 wherein the 6-deoxybromoascorbate is covalently bound to the α -NH₂ group of polylysine at C-6 position of the L-ascorbic acid and one proline at C-2 position of the L-ascorbic acid.
- 15 39. The method of claim 26 wherein the 6-deoxybromoascorbate is covalently bound to the α -NH₂ group of lysine at C-6 position of the L-ascorbic acid and a polyproline at C-2 position of the L-ascorbic acid.
40. The method of claim 26 wherein the 6-deoxybromoascorbate is covalently bound to the α -NH₂ group of lysine at C-6 position of the L-ascorbic acid and
20 a lysine-proline at C-2 position of the L-ascorbic acid.
41. The method of claim 26 wherein the 6-deoxyaminoascorbate is covalently bound to the carboxyl group of lysine at C-6 position of the L-ascorbic acid.
42. The method of claim 26 wherein the 6-deoxyaminoascorbate is covalently bound to the with carboxyl group of polylysine at C-6 position of the L-
25 ascorbic acid.
43. The method of claim 26 wherein the 6-deoxyaminoascorbate is covalently bound to the carboxyl group of lysine-proline at C-6 position of the L-ascorbic acid.
44. The method of claim 26 wherein the 6-deoxyaminoascorbate is covalently
30 bound to the carboxyl group of proline at C-6 position of the L-ascorbic acid.
45. A method of producing L-ascorbic acid derivatives, comprising the steps of:

1) treating 6-deoxybromoascorbate with lysine/lysine moieties and proline/proline moieties wherein L-ascorbic acid is covalently bound to the lysine/lysine moieties and proline/proline moieties; and

2) isolating said L-ascorbic acid derivatives; wherein the 6-deoxyaminoascorbate is covalently bound to the carboxyl group of polyproline at C-6 position of the L-ascorbic acid.

46. A pharmaceutical composition comprising an L-ascorbic acid derivative as an effective ingredient, together with a pharmaceutical acceptable carrier, wherein the L-ascorbic acid derivative is selected from the group consisting of ascorbyl-6-lysine, ascorbyl-2-lysine, ascorbyl-6-polylysine, ascorbyl-2,6-dilylsine, ascorbyl-6-polylysine-2-lysine, ascorbyl-6-lysine-2-polylysine, ascorbyl-2,6-polylysine, ascorbyl-6-proline, ascorbyl-2-proline, ascorbyl-6-polyproline, ascorbyl-2-polyproline, ascorbyl-2,6-diproline, ascorbyl-2-proline-6-polyproline, ascorbyl-2-polyproline-6-proline, ascorbyl-2,6-diproline, 6deoxyascrobyllysine, 6-deoxyascorbylproline, 6-deoxyascorbylpolylysine, 6deoxyascorbylpolyproline, 6-deoxyascorbyllysine-2-proline, 6-deoxyascorbylproline-2-lysine, 6-deoxyascorbylpolylysine-2-proline, 6-deoxyascorbylpolyproline-2-lysine, 6-deoxyascorbyllysine-2-polyproline, 6-deoxyascorbylproline-2-polylysine, 6-deoxyascorbate proline-2-lysine-proline, 6-deoxyascorbate-2-proline-lysine, 6-deoxyascorbyllysine, 6-deoxyascorbate-lysine-proline, 6-deoxyascorbyl-lysine-2-proline, 6-deoxyascorbyl-polylysine-2-proline, 6-deoxyascorbyl-lysine-2-polyproline, 6-deoxyascorbyl-lysine-2lysine-proline, 6-deoxyamino ascorbyl-polylysine, 6-deoxyamino ascorbyl-lysine-proline, 6-deoxyamino ascorbylproline, 6-deoxyamino ascorblypolyproline.

47. The composition of claim 46 wherein the composition is used to prevent the degradation of extracellular matrix.

48. The composition of claim 46, wherein the composition is used to stabilize connective tissue.

49. The composition of claim 46, wherein the composition is used to as an antioxidant.

50. The composition of claim 46, wherein the composition is used for treating damage to skin comprising applying the topical composition to the skin.